

## **TITLE**

# **COMPARISON OF SHEAR BOND STRENGTH OF ORTHODONTIC METAL AND CERAMIC BRACKETS BONDED USING MONOWAVE AND POLYWAVE LIGHT EMITTING DIODE CURING UNITS - AN INVITRO STUDY**

## **ABSTRACT**

**Introduction :** Knowledge about various light sources, their performance and polymerization efficiency and its application to orthodontic bonding can guide an orthodontist to select a best curing light for clinical use. Light emitting diode curing light is constantly evolving with newer generation at a rapid pace in the market and it replaced other curing systems like halogen or plasma arc lights. To compare the orthodontic performance of two generations of curing light, the shear bond strength of orthodontic brackets [metal and ceramic] were evaluated in this study. Monowave LED [ single peak] is the second generation LED with wavelength peak at 470 nm, so it is suitable to cure light cure materials with photoinitiator containing camphorquinone in the blue region of emission spectrum. Polywave LED [ dual peak ] is the third generation LED with two peak wavelength at 410 nm and 470 nm which can cure all the light cure materials currently available in the market including the non camphorquinone initiators such as Lucirin TPO or phenyl-propanedione which are used in the esthetic dentistry. Several studies have been published with LED lights of second generation and they have compared it to halogen light or argon laser. In this study the second and third generation LED were compared for their shear bond strength. **Objective:** To evaluate the shear

bond strength of orthodontic metal and ceramic brackets cured with the monowave and the polywave LED lights. **Methods :** 80 human premolars were randomly divided into 4 groups of 20 each based on the type of bracket material and the curing light into Group I [metal monowave], Group II[metal polywave], Group III[ceramic monowave] and Group IV[ceramic polywave]. Monowave LED used in this study is of low intensity [  $500\text{mW}/\text{cm}^2$ ] and the intensity of polywave LED is  $1100\text{mW}/\text{cm}^2$ , so polymerization time / bracket is 20 seconds for monowave LED and 10 seconds for polywave LED. Each tooth is etched with Scotchbond etchant and primed with Transbond XT and bonded with Transbond XT adhesive and 24 hours after curing, the shear bond strength is tested in an universal testing machine. Then the amount of adhesive remaining in the tooth is observed using an optical stereomicroscope and ARI scores were made. **Results:** No statistically significant difference were noted in the shear bond strength of metal brackets bonded with monowave and polywave LED[Group I and Group II], also the bond strength between the ceramic bracket groups [Group III and IV] were also similar. The frequency distribution of the **ARI** scores were also not statistically different for the four groups. **Conclusion:** The high intensity polywave LED can provide bond strength similar to the low intensity monowave LED in shorter polymerization time.

**KEYWORDS :** Polywave LED, monowave LED, metal and ceramic brackets, shear bond strength test, ARI scores.